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IN THE CLAIMS:

1. (currently amended) A system comprising:

a multisection diode laser ~~(10)~~ with a plurality of sections that are drivable by control inputs to select a desired output mode from among a plurality of available output modes;

a wavelength locker ~~(14)~~ for locking the selected output mode to a target frequency, where the wavelength locker has a characteristic response period and there are at least ~~2~~two target frequencies in each response period of the wavelength locker; and

a controller ~~(24)~~ operable to sweep the diode laser in a pre-determined frequency direction through a series of frequency points by asserting a pre-calibrated series of sets of control input values to the sections of the diode laser and using the wavelength locker to lock to each of the frequency points, wherein the frequency points are obtained from cavity modes in a plurality of different supermodes, and the sets of control input values are pre-determined to take account of thermal transients that are known to arise from jumps in the output modes that occur when sweeping through the pre-calibrated series of sets of control input values in the pre-determined frequency direction.

2. (original) The system of claim 1, wherein the controller is further operable to sweep the diode laser in the opposite frequency direction by asserting a further pre-calibrated series of sets of control input values to the sections of the diode laser, wherein the further pre-calibrated sets of control input values take account of thermal transients that are known to arise from jumps in the output modes that occur when sweeping through the further pre-calibrated series of sets of control input values in the opposite frequency direction.

3. (currently amended) The system of claim 1 ~~or 2~~, wherein at least one of the sets of control input values has control input values that deviate from their thermal equilibrium values by amounts dependent on the difference between the sum of its own control input values and those of the set of the preceding frequency point.

4. (currently amended) The system of claim 1~~, 2 or 3~~, wherein each set of control input values defines an operating point in drive current space, and drive current space is subdivided into cells defined by the output modes of the laser, wherein at least one of the sets of control input values defines an operating point that is offset from the central region of its cell in a direction of a predicted transient thermal shift in the cell when arrived at by jumping from the preceding operating point.

5. (currently amended) The system of ~~any preceding~~ claim 1, wherein when a set of control input values defines an output mode in a different supermode from the output mode of the preceding set of control input values, the set of control input values is pre-determined so that the jump to that output mode is made to occur at a frequency midway between adjacent minima and maxima of the response of the wavelength locker.

6. (currently amended) The system of ~~any preceding~~ claim 1, wherein the response period of the locker matches the ITU grid.

7. (currently amended) The system of claim 1~~6~~, wherein the response period of the locker matches the ITU grid and there are at least 4, 8 or 16 frequency points in each response period of the wavelength locker.

8. (currently amended) The system of ~~any preceding~~ claim 1, wherein the frequency points are spaced apart by a constant frequency increment.

9. (currently amended) The system of ~~any preceding~~ claim 1, further comprising a control circuit operable to output a correction signal for driving the diode laser that is dependent on the difference between a measured value output from the wavelength locker and a desired value output from the controller.

10. (original) The system of claim 9, wherein the wavelength locker has a response with a frequency derivative which alternates in sign, and the control circuit is configured so that the correction signal has a magnitude independent of the sign of the difference.

11. (original) The system of claim 9, wherein the wavelength locker has a response with

a frequency derivative which alternates in sign, and the system comprises an inverter for inverting the measured value output of the wavelength locker at turning points in the response of the wavelength locker.

12. (original) The system of claim 9, wherein the wavelength locker has a response with a frequency derivative which is always of the same sign.

13. (currently amended) The system of ~~any preceding~~ claim 1, wherein the control input values for each target frequency are stored in a look up table.

14. (currently amended) The system of claim 1~~3~~ wherein the control input values for each target frequency are stored in a look up table and variable gain enhancement is used so as to normalise the wavelength locker slope, by incorporation of variable gain potentiometer values in the look up table.

15. (original) The system of claim 14 where an offset is applied to normalise a desired locking value from the controller.

16. (currently amended) The system of claim ~~15~~14 where an offset is applied to normalise a desired locking value from the controller and wherein the offset is stored as part of the lookup table of the laser for each target frequency.

17. (currently amended) A method of sweeping a multisection diode laser ~~(10)~~ in a pre-determined frequency direction through a series of frequency points by asserting a pre-calibrated series of sets of control input values to the sections of the diode laser and using a wavelength locker ~~(14)~~ having a characteristic response period to lock to each of the frequency points, where there are at least ~~2~~two frequency points in each response period of the wavelength locker and wherein the frequency points are obtained from cavity modes in a plurality of different supermodes, and the sets of control input values are pre-determined to take account of thermal transients that are known to arise from jumps in the output modes that occur when sweeping through the pre-calibrated series of sets of control input values in the pre-determined frequency direction.

18. (original) The method of claim 17, wherein at least one of the sets of control input values has control input values that deviate from their thermal equilibrium values by amounts dependent on the difference between the sum of its own control input values and those of the set of the preceding frequency point.

19. (currently amended) The method of claim 17~~ or 18~~, wherein each set of control input values defines an operating point in drive current space, and drive current space is subdivided into cells defined by the output modes of the laser, wherein at least one of the sets of control input values defines an operating point that is offset from the central region of its cell in a direction of a predicted transient thermal shift in the cell when arrived at by jumping from the preceding operating point.

20. (currently amended) The method of claim 17~~, 18 or 19~~, wherein when a set of control input values defines an output mode in a different supermode from the output mode of the preceding set of control input values, the set of control input values is pre-determined so that the jump to that output mode is made to occur at a frequency midway between adjacent minima and maxima of the response of the wavelength locker.